



September 1986
 Revised February 2000

DM74ALS02 Quad 2-Input NOR Gate

General Description

This device contains four independent gates, each of which performs the logic NOR function.

Features

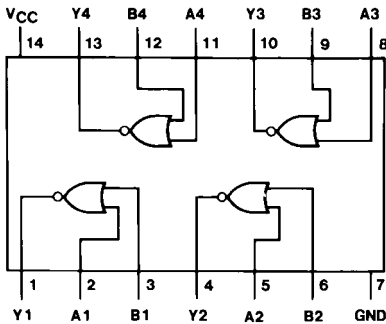
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky and low power Schottky TTL counterpart
- Improved AC performance over Schottky and low power Schottky counterparts

Ordering Code:

| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74ALS02M | M14A | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74ALS02SJ | M14D | 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| DM74ALS02N | N14A | 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagram



Function Table

$$Y = \overline{A + B}$$

| Inputs | | Output |
|--------|---|--------|
| A | B | Y |
| L | L | H |
| L | H | L |
| H | L | L |
| H | H | L |

H = HIGH Logic Level
 L = LOW Logic Level

DM74ALS02 Quad 2-Input NOR Gate

Absolute Maximum Ratings(Note 1)

| | |
|--------------------------------------|-----------------|
| Supply Voltage | 7V |
| Input Voltage | 7V |
| Operating Free Air Temperature Range | 0°C to +70°C |
| Storage Temperature Range | –65°C to +150°C |
| Typical θ_{JA} | |
| N Package | 86.5°C/W |
| M Package | 116.0°C/W |

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Recommended Operating Conditions

| Symbol | Parameter | Min | Nom | Max | Units |
|----------|--------------------------------|-----|-----|------|-------|
| V_{CC} | Supply Voltage | 4.5 | 5 | 5.5 | V |
| V_{IH} | HIGH Level Input Voltage | 2 | | | V |
| V_{IL} | LOW Level Input Voltage | | | 0.8 | V |
| I_{OH} | HIGH Level Output Current | | | –0.4 | mA |
| I_{OL} | LOW Level Output Current | | | 8 | mA |
| T_A | Free Air Operating Temperature | 0 | | 70 | °C |

Electrical Characteristics

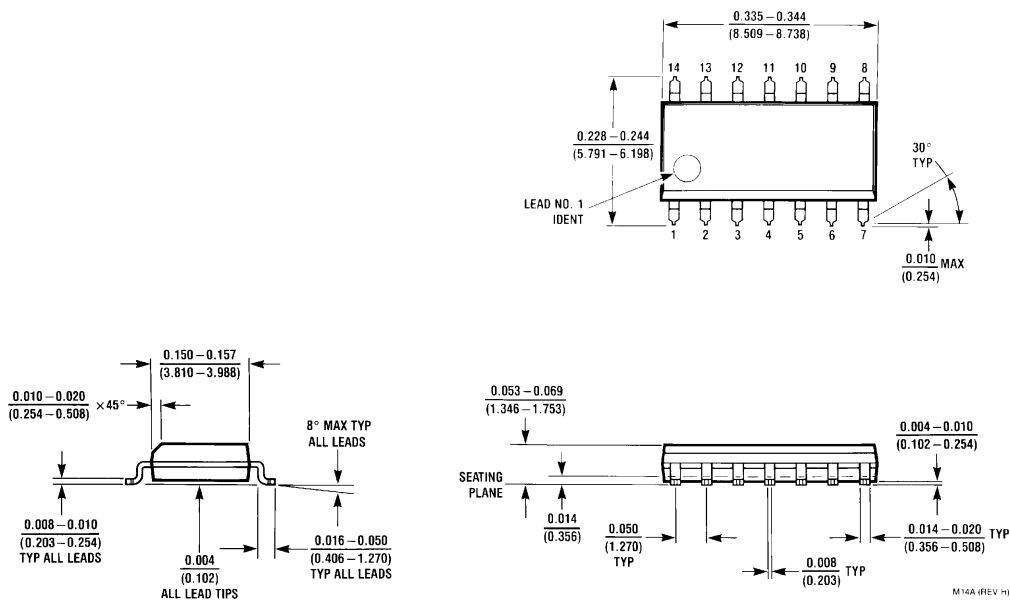
over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^\circ C$.

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|----------|------------------------------------|---|--------------|------|------|---------|
| V_{IK} | Input Clamp Voltage | $V_{CC} = 4.5V$, $I_I = -18\text{ mA}$ | | | –1.5 | V |
| V_{OH} | HIGH Level Output Voltage | $I_{OH} = -0.4\text{ mA}$ $V_{CC} = 4.5V\text{ to }5.5V$ | $V_{CC} - 2$ | | | V |
| V_{OL} | LOW Level Output Voltage | $V_{CC} = 4.5V$ $I_{OL} = 8\text{ mA}$ | | 0.35 | 0.5 | V |
| I_I | Input Current @ Max. Input Voltage | $V_{CC} = 5.5V$, $V_{IH} = 7V$ | | | 0.1 | mA |
| I_{IH} | HIGH Level Input Current | $V_{CC} = 5.5V$, $V_{IH} = 2.7V$ | | | 20 | μA |
| I_{IL} | LOW Level Input Current | $V_{CC} = 5.5V$, $V_{IL} = 0.4V$ | | | –0.1 | mA |
| I_O | Output Drive Current | $V_{CC} = 5.5V$ $V_O = 2.25V$ | –30 | | –112 | mA |
| I_{CC} | Supply Current | $V_{CC} = 5.5V$ Outputs HIGH | | 0.85 | 2.2 | mA |
| | | Outputs LOW | | 2.16 | 4 | mA |

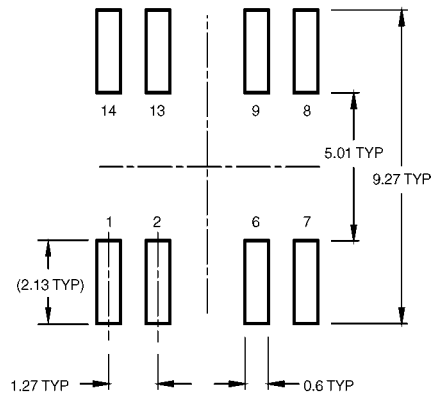
Switching Characteristics

over recommended operating free air temperature range.

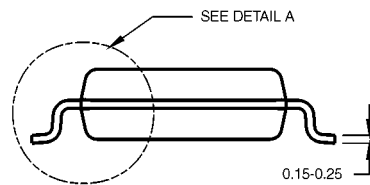
| Symbol | Parameter | Conditions | Min | Max | Units |
|-----------|--|---|-----|-----|-------|
| t_{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | $V_{CC} = 4.5V\text{ to }5.5V$ $R_L = 500\Omega$ | 3 | 12 | ns |
| t_{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | $C_L = 50\text{ pF}$ | 3 | 10 | ns |

Physical Dimensions inches (millimeters) unless otherwise noted


**14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
Package Number M14A**



LAND PATTERN RECOMMENDATION

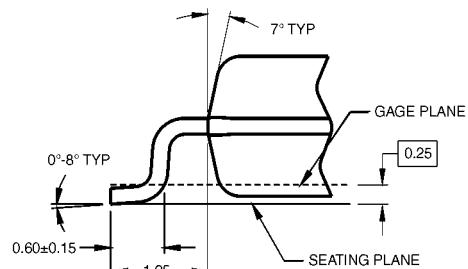


DIMENSIONS ARE IN MILLIMETERS

NOTES:

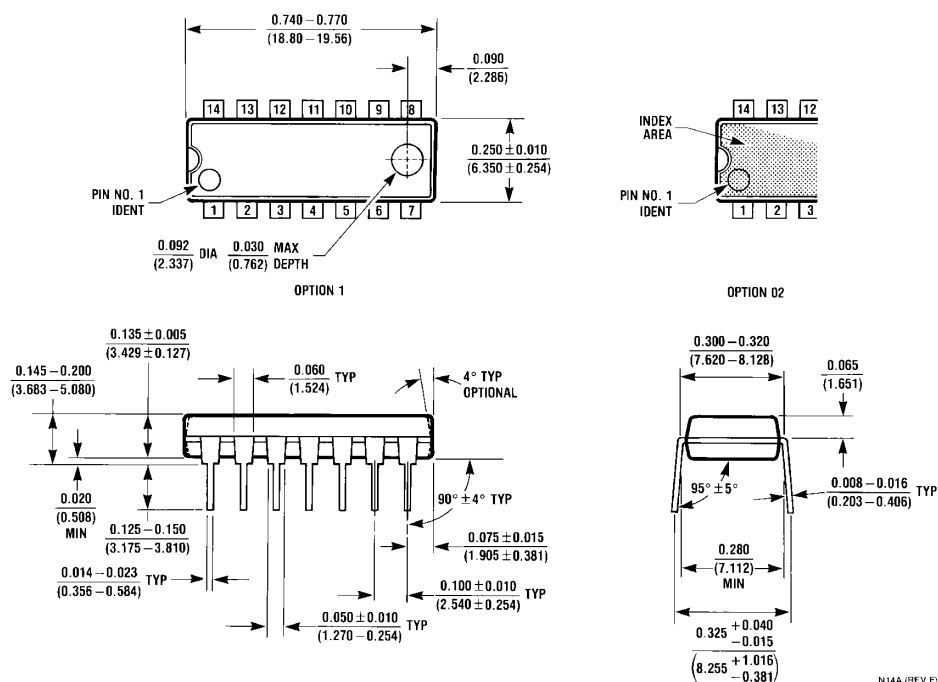
- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION,
ESTABLISHED IN DECEMBER, 1998.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD
FLASH, AND TIE BAR EXTRUSIONS.

M14DRevB1



DETAIL A

**14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M14D**

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

**14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N14A**

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